AOT Gun
Advanced Modular Gun
Large-Caliber High Velocity Launcher

Redefining – "Faster Than A Speeding Bullet"

Presented by
Applied Ordnance Technology
39th NDIA Guns & Ammunition Conference
Baltimore, MD April 2204

DISTRIBUTION UNLIMITED

PERFORMANCE

PROJECT HISTORY

DESIGN

TESTING

- Proof-of-Concept
- Dynamic Setback Test
- Barrel Joint Test

PROJECT OBJECTIVES

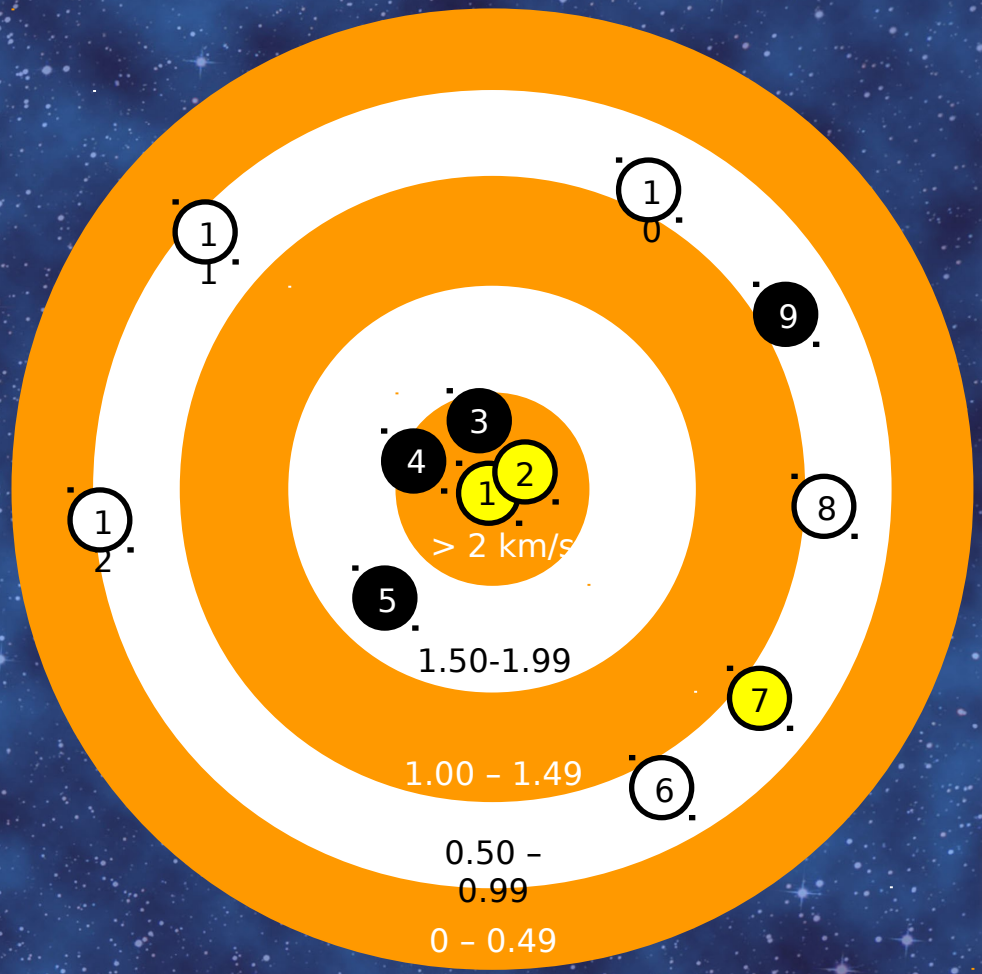
AOT Gun or XLR

Muzzle Velocities of Large Caliber Guns

1. Rail Gun 2,500 m/s
2. AOT Gun 2,400 m/s
3. 16” HARP 2,100 m/s
4. Paris Gun 2,000 m/s

5. 7” HARP 1,650 m/s
6. MK45 Mod 4 1,050 m/s

7. AGS 155mm 825 m/s
8. M198 155mm 822 m/s
9. MK7 16” 820 m/s
10. MK45 Mod 2 800 m/s
11. 8” Howitzer 595 m/s
12. M119 105mm 550 m/s



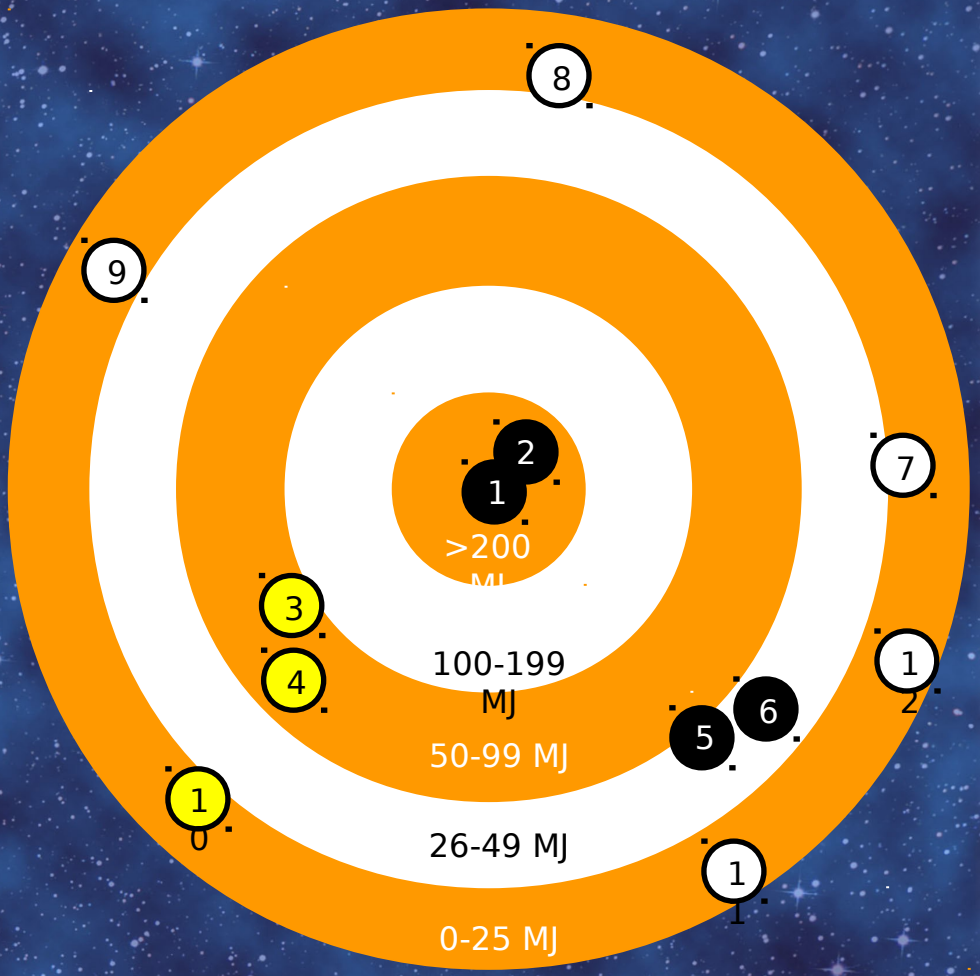
Energy Levels of Large Caliber Guns

1. MK7 16” 335 MJ
2. Paris Gun 240 MJ

3. AOT Gun 80 MJ
4. Rail Gun 64 MJ

5. 16” HARP 40 MJ
6. 7” HARP 37 MJ

7. 8” Howitzer 22 MJ
8. AGS 155mm 20 MJ
9. MK45 Mod 4 18 MJ
10. M198 155mm 15 MJ
11. MK45 Mod 2 11MJ
12. M119 105mm 4 MJ



NSFS Objective:

- Long Range 40-60nm
- Volume Fire from the Sea
- Timely Response
- Deep Strike

Arsenal Ship

Navy Submitted SBIR Topic in 1996 for Vertical Gun System

AOT was awarded a Phase I contract and the rest is history

AOT designed a high energy, high-pressure, large-volume, chemical gun system.

XLR Concept

High Energy, High Velocity, High Pressure

Separable Chamber

Multiple, Large Volume Chambers

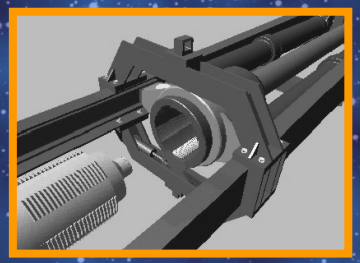
Disposable Sealing Cartridge

Segmented Barrel

Patent 6,571,676

Separable Chamber

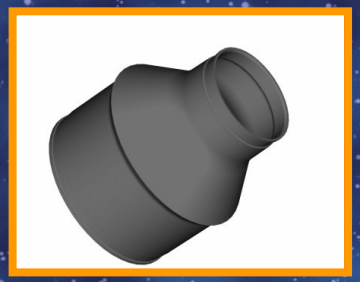
- Removable Chamber
- Disposable Sealing Cartridge
- Alternate Propellants (e.g., light gas)



Separable Chamber (shown in yellow)

Modular Chambers

- Multiple Chambers
- Chambers of Different Volumes
- Loading from Top



Chambrage Seal Cartridge

Segmented, Smoothbore Barrel

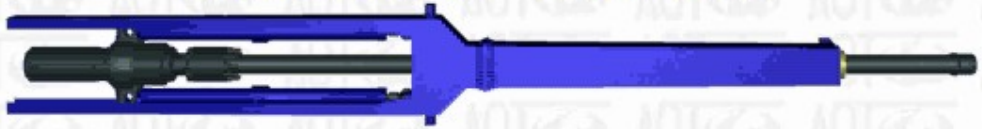
- Varying Barrel Length

Design - Modular Test Gun Upgrades

210 Caliber Upgrade

160 Caliber Upgrade

110 Caliber Test Gun



- Versatile
- Multiple Uses
- Large Caliber

FEATURE	ADVANTAGE	BENEFIT
Modular Design	Multiple Gun Sizes (different chambers and varying barrel length)	Adaptable Design to Many Different Requirements Tailor Gun Performance Parameters
Replaceable Chambrage Sealing Cartridge	Protects Forcing Cone Area	Ideal Test Article for Gun Technology Experiments
Multiple Chambers	More than One Chamber Can be Used; Different Volumes Permissible	Not Locked into a Given Chamber Volume
Large Volume Chamber	Large Quantity of Propellant	High Energy
Segmented Barrels	Long Barrel Length Test Barrel Segment	High Muzzle Velocity Reduced Cost

POC Test 2003

Evaluated 2 Seal Config.
- O-ring design
- Non o-ring Design

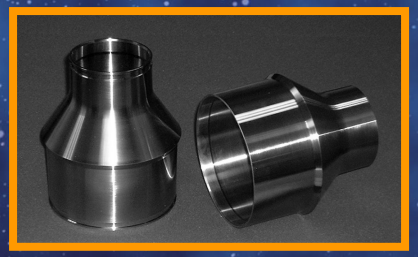
Shots at 30-60 KSI Pressures

Over 60 shots conducted

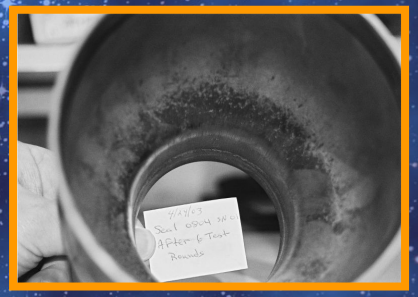
Multiple Shots on Some Seals
- One Seal Subjected to 40 Shots

Both Seal Config. Held Pressure

Test 100% Successful



Sealing Cartridge
(o-ring config. shown on left)



S/N 03 After
6 Shots

S/N 01 After 1 Shot

Special Thanks to Benét Labs for Supporting Test.

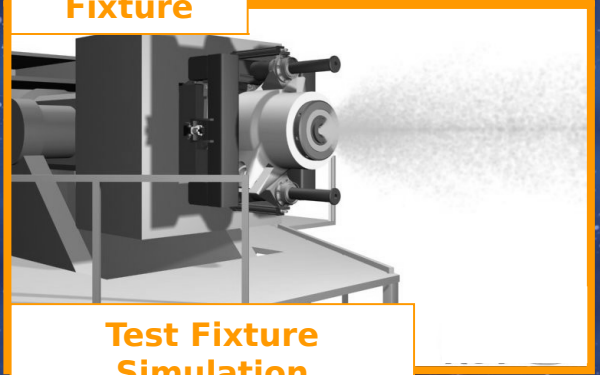
Verification Test - Setback Test

IPT - AOT, Dahlgren, Indian Head

- **Full-scale Testing**
- **Nozzle/Throttle to Simulate P-t Curve**
- **Sealing Cartridge Performance**
- **Chamber Pressures Up to 100 KSI**
- **Chamber/Barrel Interface Motion**
- **Chamber Connection**

Dahlgren Gun Mount

Test Fixture

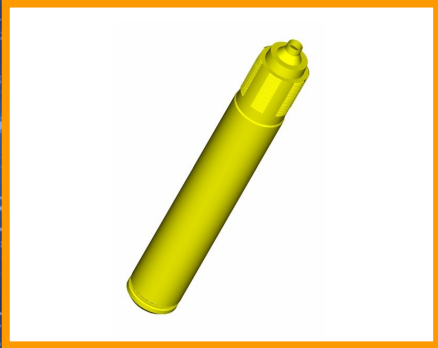


Test Fixture Simulation

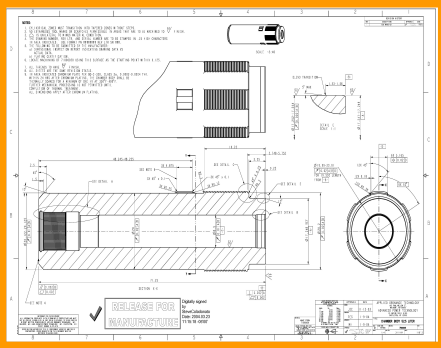
Setback Test Simulation

Setback Test Simulation

Chamber In Production
(Used in Verification Testing)

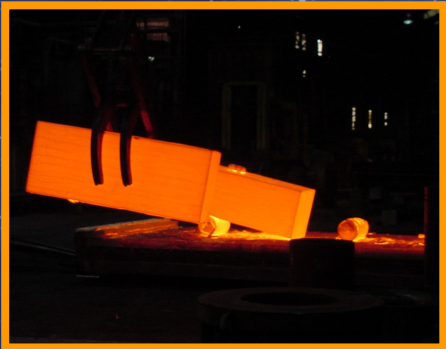


1. Chamber Design

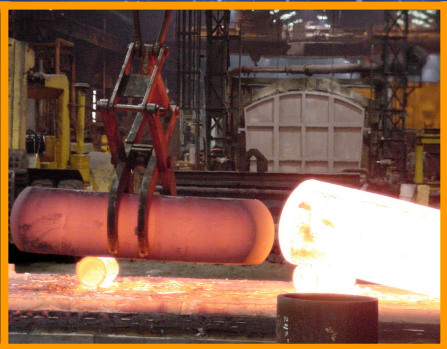


2. Drawing

3. Billet Being Saw Cut



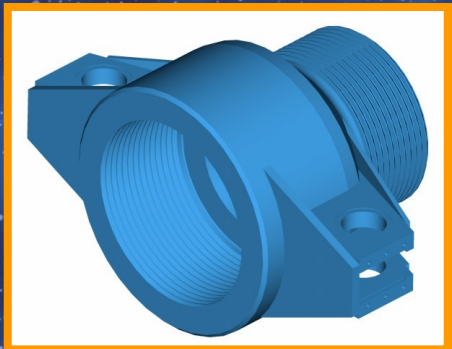
4. Billet Out of Furnace



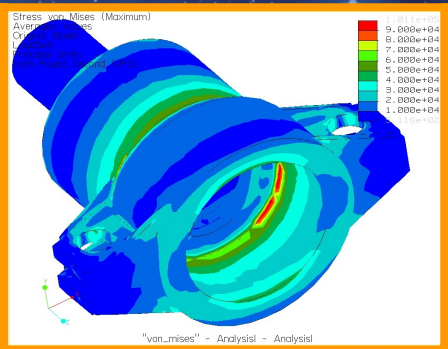
5. Billet During Shaping (chamber billet on left)

6. Chamber Rough Shape

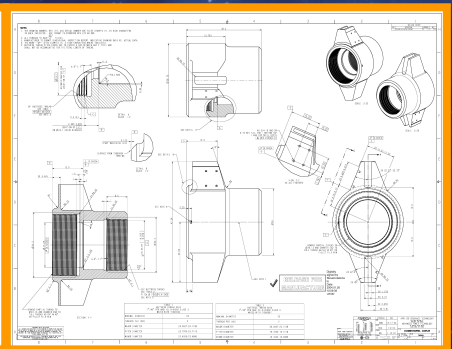
Barrel/Chamber Coupler
(Used in Verification Testing)



1. Coupler Design



2. Coupler FEA



3. Drawing

4. Billet After Saw Cut

5. Coupler in Furnace

6. Rough Machine

Verification Test - Barrel Joint Test

IPT - AOT, Dahlgren, Indian Head

Attach Barrel Segment to Existing Test Fixture

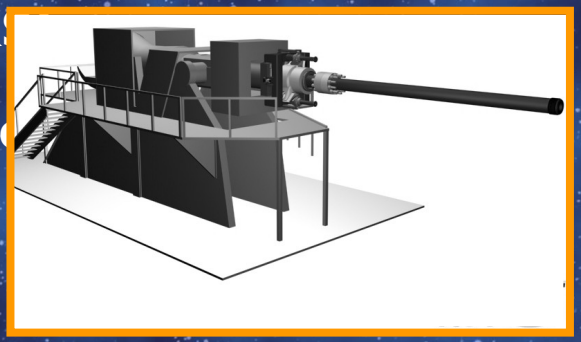
Continued Evaluation of Sealing Cartridge Performance

Chamber Pressures Up to 80 K

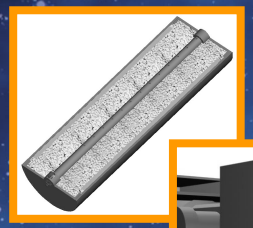
Chamber/Barrel Interface Moti

Combustible Cartridge Case

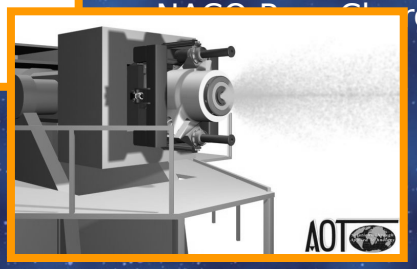
Barrel Joint Seal



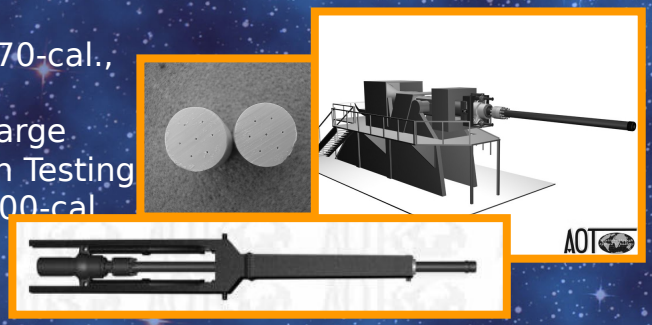
Upcoming Activities



- 2004
- Verification Test - Setback



- 2005
- Verification Test - Barrel Joint
- Use XLR Mod 0 (5”/70-cal., < 2km/s)
  - EX-99 Prop Charge
  - Wear & Erosion Testing
- Build XLR Mod 1 (100-cal < 2.4km/s)



- 2006
- Indian Head’s Advanced Propellants (co-layered Propellant Configurations; High Nitrogen Ingredients for Reduced Erosivity)
- Use XLR Mod 1
- Build XLR Mod 2 (200-cal., > 2.5 km/sec possible)

- Gun Instrumentation & Safety Systems
- Wear & Erosion Mitigation
- Barrel Coatings/Liners
- Lightweight Barrel Materials
- Ignition Systems
- Advanced Chemical Propellants
- Advanced Projectiles

The project objective is to provide the DoD community with a high energy, high pressure, high velocity TEST GUN for advancing gun technology

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